REMARKS/ARGUMENTS

Claims 1 – 20 are presented for reconsideration and further examination in view of the foregoing amendments and the following remarks.

In the outstanding Office Action, the Examiner rejected claims 1 – 20 under 35 U.S.C. §112, first paragraph as failing to comply with the written description requirement; rejected claims 1 – 20 under 35 U.S.C. §112, second paragraph as being indefinite; rejected claims 1 – 6, 9, 11, 12 and 14 – 18 under 35 U.S.C. §103(a) as being unpatentable over reference no. WO 99/16380 to Taub et al. (hereinafter referred to as "the Taub et al. '380 reference") in view of U.S. Patent No. 6,152,731 to Jordan et al. (hereinafter referred to as "the Jordan et al. '731 patent") and reference no. WO 99/34747 to Taub (hereinafter referred to as "the Taub et al. '747 reference"); rejected claims 7 and 13 under 35 U.S.C. §103(a) as being unpatentable over the Taub et al. '380 reference in view of the Jordan et al. '731 patent, the Taub et al. '747 reference, U.S. Patent No. 4,850,864 to Diamond (hereinafter referred to as "the Diamond '864 patent") and further in view of U.S. Patent No. 6,413,083 to Hamilton (hereinafter referred to as "the Hamilton '083 patent"); rejected claims 8 and 10 under 35 U.S.C. §103(a) as being unpatentable over the Taub et al. '380 reference in view of the Jordan et al. '731 patent, the Taub '747 reference and the Diamond '864 patent and further in view of U.S. Patent No. 6,227,850 to Chishti et al. (hereinafter referred to as "the Chishti et al. '850 patent"); rejected claim 19 under 35 U.S.C. §103(a) as being unpatentable over the Taub et al. '380 reference in view of the Jordan et al. '731 patent, Taub et al. '747 reference and the Diamond '864 patent and further in view of U.S. Patent No. 6,350,120 to Sachdeva et al. (hereinafter referred to as "the Sachdeva et al. '120 patent"); and rejected claim 20 as being unpatentable over the Taub '380 reference in view of the Jordan et al. '731 patent, the Taub et al. '747 reference and the Sachdeva et al. '120 patent.

By this Response and Amendment, claims 1, 11, 18 and 20, have been amended to be in the form they were in the amendment filed June 27, 2006 and, as amended, the rejections thereto and the rejections to the claims dependent thereon have been traversed. Therefore, Applicants submit that the no new matter, within the meaning of 35 U.S.C. §132, has been introduced to the application.

Rejections Under 35 U.S.C. §112, First Paragraph

The Examiner rejected claims 1 – 20 as containing new matter. Specifically, the Examiner notes that the phrase "an exclusively virtual image of at least one tooth" is not found in the original specification.

Response

By this Response and Amendment, Applicants respectfully traverse the Examiner's rejection. Applicant submits that support for the "exclusive" language in the claims may be found on page 4, lines 7 to 15 of the originally filed specification, in which it is clearly stated that "*the* basis for the displayed image is a virtual representation..." and not "a basis...." Further, page 4, lines 20 to 23 show that the virtual representation is processed to generate *an* output data, and "*the* output data drives the display to display the image ...." Thus it is clear that the displayed image is derived only from the virtual representation. Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejection under 35 U.S.C. §112, first paragraph.

Rejections Under 35 U.S.C. §112, Second Paragraph

The Examiner rejected claims 1 – 20 as containing being indefinite. Specifically, the Examiner

asserted that the language reciting "displaying... in any of three dimensions" renders claims 1 and 11 indefinite.

Response

By this Response and Amendment, the language rejected by the Examiner has been deleted from claims 1, 11 and 18 thereby rendering the rejection thereto and to the claims dependent thereon moot. Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejection under 35 U.S.C. §112, first paragraph.

Rejections Under 35 U.S.C. §103(a)

To establish a *prima facie* case of obviousness, the Examiner must establish: (1) some suggestion or motivation to modify the references exists; (2) a reasonable expectation of success; and (3) the prior art references teach or suggest all of the claim limitations. *Amgen, Inc. v. Chugai Pharm. Co.*, 18 USPQ2d 1016, 1023 (Fed. Cir. 1991); *In re Fine,* 5 USPQ2d 1596, 1598 (Fed. Cir. 1988); *In re Wilson*, 165 USPQ 494, 496 (CCPA 1970).

1. **The Taub et al. '380 Reference In View Of The Jordan et al. '731 Patent**

The Examiner rejected claims 1 – 6, 9, 11, 12 and 14 – 18 as being unpatentable over the Taub et al. '380 reference in view of the Jordan et al. '731 patent and the Taub et al. '747 reference. Also, the Examiner rejected claim 20 as being unpatentable over the Taub '380 reference in view of the Jordan et al. '731 patent, the Taub et al. '747 reference and the Sachdeva et al. '120 patent.

Response

By this Response and Amendment, Applicants respectfully traverse the Examiner's rejection, since the combination of prior art references does not disclose, teach or suggest all of the features of the independent claims of the present application.

Independent claims 1, 11, 18 and 20 similarly recite "...processing said virtual representation to generate an output data, the output data driving a display to display an exclusively virtual image of at least one tooth with a bracket thereon, the displayed image having three-dimensional qualities indicative of said at least one tooth as viewed from a defined viewpoint...."

The Taub et al. '380 reference discloses a device for providing guidance information for an intended position of a real orthodontic element on a tooth's surface and simultaneously positioning the element on the tooth's surface according to the intended position. The device requires the use of a positioning device 20 for placing a bracket on a tooth. The bracket 20 includes a camera 26 (or other imaging device) mounted on a mount. The Jordan et al. '731 patent discloses a method of creating a three-dimensional dental model. The instrument is held by a dentist and used to apply a bracket on a tooth using the real image displayed on the computer. The Sachdeva et al. '120 patent discloses using a three-dimensional digital model of an orthodontic structure to develop a custom jig for installing an orthodontic bracket.

In contrast to the presently claimed invention the cited prior art combination does not disclose, teach or suggest "processing said virtual representation to generate an output data, the output data driving a display to display an exclusively virtual image of at least one tooth with a bracket thereon, the displayed image having three-dimensional qualities indicative of said at least one tooth as viewed from a defined viewpoint" as similarly recited in independent claims 1, 11, 18

and 20. The Examiner states that to exclusively use just the virtual images in the Taub et al. '380 reference is an obvious matter of choice in not using a method step. Applicant disagrees. The Taub et al. '380 reference is specifically based on acquiring a real-life image of the tooth or element, and then comparing this image with indicators, etc. While displaying a real-life image is required in the Taub et al. '380 reference, displaying the virtual image is not, and indicators may be displayed instead of the virtual image, but together with the real-life image (page 3, line 28 to page 4, line 4; page 4, lines 22 – 23). Thus, to say that the step of acquiring and displaying the real life image may be omitted and replaced with an exclusively virtual image is obvious is clearly not correct, and rather, it would appear that the Taub et al. '380 reference in fact teaches against doing so. The Taub et al. '380 reference also clearly distinguishes between a real life image and a virtual image.

It is also not obvious to combine the Taub et al. '380 reference with another reference to provide a virtual image showing 3D attributes. The Taub et al. '380 reference is directed to obtaining a real life image of the tooth/element and comparing this to a virtual image or indicators superimposed with the virtual image until the two coincide. To do this rapidly (real time – see the Taub et al. '380 reference at pg. 6, line 2), a relatively simple virtual image or marker is preferable since they may be manipulated at minimum computing time, while changes in more complex virtual images including 3D attributes to match the real life image would take longer to compute. Thus, providing an image with 3D attributers is not obvious.

Further, when alignment between two images is required (in the Taub et al. '380 reference, the real-life image with the virtual image), it is often easier to identify a number of discrete points or discrete curves for example the "indicators" or "boundaries of the tooth" and to align the images based on these points/curves than to attempt to fully align two fully 3D images. In the Taub et al.

'380 reference, providing 3D attributes to the virtual image may actually confuse the user, since the closer to real-life the 3D virtual image becomes, the more difficult it becomes to distinguish between the actual real-life image and the virtual image, and thus to determine how to further manipulate the bracket etc. to further align the images.

Since all of the features of independent claims 1, 11, 18 and 20 are not disclosed, taught or suggested by the cited prior art combination, the cited prior art combination does not render the presently claimed invention obvious. Similarly, as dependent claims necessarily recite all of the features of the independent claim from which they depend, claims 2 – 6, 9, 11, 12 and 14 – 17 are asserted to be patentable over the cited prior art combination for at least the same reasons as their respective independent claims. Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the rejection under 35 U.S.C. §103(a).

2. Adding The Diamond '864 Patent, The Hamilton '083 Patent, The Chishti et al. '850 Patent or The Sachdeva et al. '120 Patent to the Primary Prior Art Combination, The Taub et al. '380 Reference In View Of The Jordan et al. '731 Patent, The Taub et al. '747 Reference

The Examiner rejected claims 7 and 13 as being unpatentable over the Taub et al. '380 reference in view of the Jordan et al. '731 patent, the Taub et al. '747 reference, the Diamond '864 patent and further in view of the Hamilton '083 patent; rejected claims 8 and 10 under as being unpatentable over the Taub et al. '380 reference in view of the Jordan et al. '731 patent, the Taub '747 reference and the Diamond '864 patent and further in view of the Chishti et al. '850 patent; and rejected claim 19 as being unpatentable over the Taub et al. '380 reference in view of the Jordan et al. '731 patent, Taub et al. '747 reference and the Diamond '864 patent and further in view of the Sachdeva et al. '120 patent.

Response

By this Response and Amendment, Applicants respectfully traverse the Examiner's rejection, since all of the features of the presently claimed invention are not disclosed, taught or suggested by the cited prior art. The arguments above with respect to the Taub et al. '380 reference, the Jordan et al. '731 patent and the Taub '747 reference are incorporated by reference.

Adding any combination of the Hamilton '083 patent, the Diamond '864 patent, the Chishti et al. '850 patent, or the Sacheva et al. '120 patent to the primary prior art combination of the Taub et al. '380 reference, the Jordan et al. '731 patent and the Taub et al. '380 reference does not cure the deficiencies of the primary prior art combination.

The Diamond '864 patent discloses a bracket placing instrument usable with a computer that displays an image of a tooth. The instrument is held by a dentist and used to apply a bracket on a tooth using the real image displayed on the computer. The Hamilton '083 patent discloses a computerized system for diagnosing a tooth-size discrepancy and recommending an ideal arch size based on the size of an individual patient's teeth. The Chishti et al. '850 patent discloses a system that captures three-dimensional (3D) data associated with a patient's teeth, determines a viewpoint for the patient's teeth, applies a positional transformation to the 3D data based on the viewpoint, and renders the orthodontic view of the patient's teeth based on the positional transformation. And, the Sachdeva et al. '120 patent discloses using a three-dimensional digital model of an orthodontic structure to develop a custom jig for installing an orthodontic bracket.

However, none of the cited prior art references, alone or in any combination, discloses teaches or suggests "processing said virtual representation to generate an output data, the output data

driving a display to display an exclusively virtual image of at least one tooth with a bracket thereon, the displayed image having three-dimensional qualities indicative of said at least one tooth as viewed from a defined viewpoint" as similarly recited in independent claims 1, 11 and 18. The prior art combinations are silent with respect to exclusive use of a virtual image.

As such, the addition of the Diamond '864 patent, the Hamilton '083 patent, the Chishti et al. '850 patent, or the Sachdeva et al. '120 patent to the combination of the Taub et al. '380 reference with the Jordan et al. '731 patent does not render independent claims 1, 11 and 18 obvious. Similarly, as dependent claims contain all of the features of the independent claims from which they depend, the cited prior art combination does not render claims 2 – 10, 12 – 17 and 19 obvious for at least the same reasons as claims 1, 11 and 18. Accordingly, Applicants respectfully request that the Examiner reconsider and withdraw the outstanding rejection under 35 U.S.C. §103(a).

CONCLUSION

In light of the foregoing, Applicants submit that the application is now in condition for allowance. If the Examiner believes the application is not in condition for allowance, Applicants respectfully request that the Examiner contact the undersigned attorney if it is believed that such contact will expedite the prosecution of the application.

In the event this paper is not timely filed, Applicants petition for an appropriate extension of time. Please charge any fee deficiency or credit any overpayment to Deposit Account No. 14-0112.

Respectfully submitted,

THE NATH LAW GROUP

Date: April 27, 2007

By: _____

Gary M. Nath
Registration No. 26,965
Jerald L. Meyer
Registration No. 41,194
Derek Richmond
Registration No. 45,771
Customer No. 20529

THE NATH LAW GROUP
112 South West Street
Alexandria, VA 22314
(703) 548-6284